—Thus, the choice of S-T codes for k separable spatial-multiplexed streams SM_i can be based on the LCR and LC duration at a given threshold level and a maximum acceptable error rate. Average SINR can also give similar kind of information. This error information is used directly by unit **90** as the quality parameter or is used to derive the quality parameter. The other signal criteria can be used in a similar fashion to be employed by unit **90** directly as the quality parameter or to derive a quality parameter. —

Please replace the paragraph beginning at line 11 of page 23 with the following rewritten paragraph:

—Alternatively, and preferably in addition to unit **90** a signal statistics of output streams unit **94** is used to analyze reconstructed streams SM_i obtained from S-T Decoding Unit **88**. Once again, unit **94** can perform the same statistical computations of reconstructed streams SM_i to obtain signal statistics including signal-to-interference noise ratio (SINR), signal-to-noise ratio (SNR), power level, level crossing rate (LCR), level crossing duration and reception threshold or other signal parameters. Meanwhile, reconstructed streams SM_i are converted to a serial stream by parallel to serial converter **96**. Then, they are de-interleaved and decoded by de-interleaver and decoder **98** to recover data **52'** (the prime indicates that the recovered data may differ from original data **52** due to transmission errors) originally transmitted from transmit unit **50**. —

Please replace the paragraph beginning at line 1 of page 24 with the following rewritten paragraph:

—During regular operation, transmit unit **50** selects G(z), k, k' and S-T codes at system initialization. These parameters are then updated as the channel changes. Transmit unit **50** sends control information **102** (see Fig. **5A**), including the S-T codes used, the value k, the matrix set G(z) being applied by transmit processing unit **72** etc. regularly to receive unit **80**. Alternatively, this information may be transmitted only once during initialization of a communication session and then updated as required (e.g., only when one of these pieces of information changes). —

In the claims:

Please cancel claims 2, 4, and 31; and please amend claims 1, 3, 5, 14, 21 to read as follows:

1. (**amended**) A method of maximizing a communication parameter of a channel between a transmit unit having a number M of transmit antennas and a receive unit having a number N of receive antennas, said method comprising the following steps:
   a) processing said data to produce parallel spatial-multiplexed streams SM_i, where i=1...k;
   b) mapping said spatial-multiplexed streams SM_i to transmit signals TS_p, where p=1...M, for transmission from said M transmit antennas to said

receiver via said channel, wherein the mapping comprises processing each of said spatial-multiplexed streams SM_i by a coding unit to produce coded streams CS_h, where h=1...k';

c) receiving receive signals RS_j, where j=1...N by said N receive antennas;

d) assessing a quality parameter of said receive signals RS_j;

e) using said quality parameter to adjust k to maximize said communication parameter of said channel; and

f) using said quality parameter in said transmit unit to adjust k'.

2~~3~~. (**amended**) The method of claim 1, wherein said quality parameter is utilized in said transmit unit to adjust the coding of said coding unit.

3~~5~~. (**amended**) The method of claim 1, wherein said coding unit is selected from the group consisting of space-time coders, space-frequency coders, adaptive modulation rate coders.

12~~14~~. (**amended**) The method of claim 1, wherein said quality parameter is fed back to said transmit unit.

19 ~~21~~. (**amended**) A communication system with an adaptively maximized communication parameter of a channel in which data is transmitted between a transmit unit having a number M of transmit antennas and a receive unit having a number N of receive antennas, said transmit unit comprising:

a) processing means for processing said data to produce parallel spatial-multiplexed streams SM_i, where i=1...k;

b) antenna mapping means for converting said spatial-multiplexed streams SM_i to transmit signals TS_p, where p=1...M, and transmitting said transmit signals TS_p from said M transmit antennas via said channel;

said receive unit receiving receive signals RS_j, where j=1...N, and said communication system comprising:

a) means for assessing a quality parameter of said receive signals RS_j;

b) means for adjusting k based on said quality parameter to maximize said communication parameter of said channel; and

c) an adaptive controller in communication with said processing means and said antenna mapping means, said adaptive controller adjusting said processing means and said antenna mapping means based on said quality parameter.